

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
16 September 2004 (16.09.2004)

PCT

(10) International Publication Number  
**WO 2004/078542 A1**

(51) International Patent Classification<sup>7</sup>: **B60S 3/00**

(21) International Application Number:  
PCT/KR2004/000433

(22) International Filing Date: 28 February 2004 (28.02.2004)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:  
20-2003-0006323 4 March 2003 (04.03.2003) KR

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(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,  
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TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

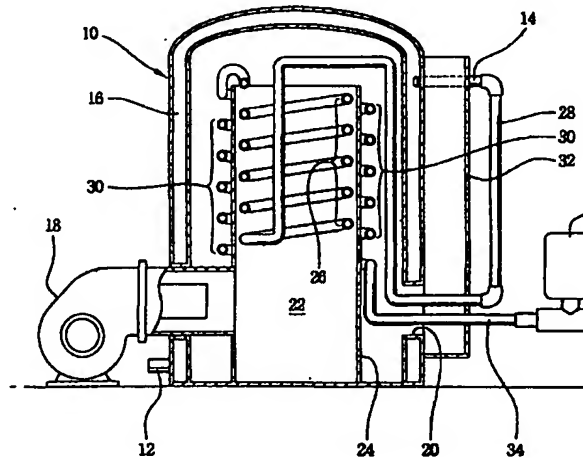
(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-  
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,  
GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK,  
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,  
ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: THE STEAM GENERATOR FOR WASHING A CAR



(57) Abstract: Provided is the steam generator for washing a car including a casing having an inlet and an outlet to supply/discharge water for car washing, a water reservoir formed of a dual wall to form a layer for preheating water and insulating heat, and a burner and a discharge hole at both sides of the water reservoir. A cylindrical wall body has an open upper portion and is installed inside the casing to form a combustion chamber and simultaneously a combustion gas discharge delay path. A first heating portion is installed in the wall body and heats the water supplied through a connection pipe and preheated in the water reservoir. A second heating portion is interposed between the casing and the wall body and connected to the first heating portion, to reheat the water primarily heated by the first heating portion. A waste gas discharge pipe is installed on and along an outer wall of the casing. A steam discharge pipe extends from an end portion of the second heating portion and penetrates the discharge hole of the casing and the waste gas discharge pipe to an outside thereof.

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## THE STEAM GENERATOR FOR WASHING A CAR

### Technical Field

The present invention relates to a car washing machine using a high  
5 pressure steam, and more particularly, to a steam generator for car washing  
which can be used at an existing car wash or for visiting car washing, that is,  
a car washing man directly visits a place where a car is and washes the car  
by an order of a car owner.

### 10 Background Art

Washing a car using water is performed by generally injecting water  
at a high pressure in form of minute particles to a surface of the car to  
forcibly remove foreign materials such as dust adhering on the surface.  
The car washing using water exhibits a superior washing ability but is  
15 disadvantageous because it uses a large amount of water. Thus, such car  
washing using water increases a cost for car washing due to the cost for  
water and goes against saving of water.

Recently, a demand of visiting car washing increases. However, in  
case of car washing using water requires a large amount of water for  
20 cleaning to be brought and an additional pressure generating equipment for  
injection at a high pressure. Thus, a cost of visit car washing increases so  
that car washing using water is not appropriate for visit car washing.

To solve the above problem, a car washing machine enabling  
conveniently car washing using as small amount of water as possible has  
25 been developed. For example, a car washing machine using steam  
injected at a high pressure is developed.

A variety of the car washing machines using high pressure steam  
have been developed and put into use. The car washing machine using  
high pressure steam performs car washing with as a small amount of water as  
30 possible, that is, by heating water to injecting both pressure steam using

naturally generated pressure steam and water droplets in a minute particle state not being vaporized.

However, a quick steam generation is needed for a car washing machine using high pressure steam. In other words, in case of visiting car washing, to perform a car washing work as quickly as possible, water must be quickly heated to generate high pressure steam. However, in conventional car washing machines, since they have a structurally short gas exhaust path due to a compact size thereof, heat is discharged outside and loss of heat is great so that a thermal efficiency is low. Furthermore, since water is not quickly heated, that is, preheat of water is not configured well, the time to heat water extends and heat is not used effectively. Thus, consumption of fuel increases so that car washing is not quickly performed.

In addition, a heat insulation structure is insufficient so that an accident such as a burn occurs during car washing.

#### Disclosure of Invention

To solve the above and other problems, it is an object of the present invention to provide the steam generator for washing a car in which a path for discharging a combustion gas are multi-stepped and curved zigzag to delay discharge of the combustion gas so that wasted heat is reduced, a thermal efficiency is improved, and consumption of fuel is reduced.

It is another object of the present invention to provide the steam generator for washing a car in which a waster supply pipe is installed along the multi-stepped combustion gas discharge path to improve a water preheating effect and a multi-step heating portion having at least two steps is provided to quickly generate high pressure steam for a short time so that car washing is quickly finished.

It is yet another object of the present invention to provide the steam generator for washing a car in which an outer wall of a combustion chamber is formed of a dual wall to preheat water being supplied so that an insulation effect is improved and an accident such as a burn is prevented.

According to an aspect of the present invention, the present invention provides the steam generator for washing a car comprises a casing having an inlet and an outlet for supplying/discharging water for car washing, a water reservoir formed of a dual wall to form a layer for preheating water and insulating heat, and a burner and a discharge hole at both sides of the water reservoir, a cylindrical wall body having an open upper portion and installed inside the casing with a gap therefrom and to a predetermined height from a bottom of the casing, to form a combustion chamber and simultaneously a combustion gas discharge delay path, a first heating portion installed in the wall body and heating the water supplied through a connection pipe connected to the outlet and preheated in the water reservoir, a second heating portion interposed between the casing and the wall body and connected to an end portion of the first heating portion, to reheat the water primarily heated by the first heating portion, a waste gas discharge pipe installed on and along an outer wall of the casing to a predetermined length from the discharge hole, a steam discharge pipe extending a predetermined length from an end portion of the second heating portion and penetrating the discharge hole of the casing and the waste gas discharge pipe to an outside thereof, and an auxiliary tank which is provided on the steam discharge pipe to temporarily store steam and discharge the stored steam when a steam injection pressure decreases so as to maintain a constant steam injection pressure.

#### Brief Description of the Drawings

FIG. 1 is a plan view illustrating the steam generator for washing a car according to an embodiment of the present invention; and

FIG. 2 is a sectional view illustrating the structure of the steam generator of FIG. 1.

#### Best Mode for Carrying Out the Invention

Referring to FIG. 1, reference numeral 10 denotes a casing. The case 10 forms an outside of a steam generator according to an embodiment of the present invention and can be manufactured in a variety of shapes. The casing 10 includes an inlet 12 and an outlet 14 for supplying and discharging water for car washing. A water reservoir 16 formed of a dual wall forms a layer for preheating and insulating the water. A burner 18 and a discharge hole 20 are arranged at both sides of a lower portion of the water reservoir 16. The burner 18 is of a typical electric ignition type and uses petroleum and gas.

10 A wall body 24 is installed in the casing 10 to a predetermined height from a bottom with a certain gap therefrom. The wall body 24 is cylindrical and having an open upper portion which forms a first combustion chamber 22 and simultaneously a combustion gas discharge delay path. In other words, combustion heat of the burner 18 goes up through the first  
15 combustion chamber 22, that is, the open upper portion of the wall body 24. The combustion heat passes through a space between the casing 10 and the wall body 24 and is discharged through the discharge hole 20 so that the discharge of the combustion gas is delayed. Such a delay of the combustion gas reduces waste heat and improve a thermal efficiency.  
20 Thus, consumption of fuel is reduced.

A first heating portion 26 which is directly heated by combustion heat of the burner 18 is installed inside the wall body 24. The first heating portion 26 primarily heats the water which is supplied through a connection pipe 28 connected to the outlet 14 of the casing 10 and preheated by the  
25 water reservoir 16. Although the first heating portion 26 is formed by bending a pipe to be spiral, it may have another shape, that is, a cylindrical water reservoir shape.

Also, a second heating portion 30 is installed between the casing 10 and the wall body 24. The second heating portion 30 is connected to an  
30 end portion of the first heating portion 26 and reheats the water heated by the first heating portion 26. Then, the water is vaporized and a small

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amount of minute water droplets are generated. Although the second heating portion 30 is formed by bending a pipe to be spiral like the first heating portion 26, it may have another shape, that is, a cylindrical water reservoir shape. Thus, the steam car washing is performed using the steam and minute water droplets.

A semicircular waste gas discharge pipe 32 is installed on and along an outer wall of the casing 10 to a predetermined length from the discharge hole 20. The waste gas discharge pipe 32 is bent again to delay the discharge of the combustion gas, as described above. The heat remaining in waste heat discharged through the waste gas discharge pipe 32 heats the casing 10 so that loss of heat discharged to the outside is reduced.

A steam discharge pipe 34 is connected to an end portion of the second heating portion 30 and extending a predetermined length so as to penetrate the discharge hole 20 of the casing 10 and the waste gas discharge pipe 32. A nozzle is connected to the steam discharge pipe 34 so that steam car washing is performed.

An auxiliary tank 36 is provided at an appropriate position of the steam discharge pipe 34, which maintains a uniform steam injection pressure by discharging temporarily stored steam when the steam discharge pressure decreases. The auxiliary tank 36 has a structure to naturally store steam during a step of injecting the steam at a normal pressure. While the auxiliary tank 36 has a role of a simple container at a normal pressure, when a steam injection pressure decreases, the steam stored in the auxiliary tank 36 is discharged to maintain a constant steam injection pressure.

In addition to the auxiliary tank 36, additional apparatuses such as a pressure gauge may be installed on the steam discharge pipe 34.

#### Industrial Applicability

In the present invention, water for car washing is preheated using the water reservoir of the casing. The preheated water is supplied through the connection pipe connected along the combustion gas discharge path forming

a path multi-stepped and curved zigzag, and heated by the first and second heating portions. Thus, a high pressure steam is generated within a short time so that loss of heat is reduced and a thermal efficiency is improved. Also, a cost of fuel is reduced and car washing can be completed within a short time.

The present invention has an effect of preventing an accident such as a burn by using a main wall of the casing as a water reservoir which provides a preheating effect and an insulation effect.

The present invention also has an effect of maintaining a constant steam injection pressure by using the auxiliary tank.

While this invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

**What is claimed is:**

1. The steam generator for washing a car comprising:
  - a casing having an inlet and an outlet for supplying/discharging water for car washing, a water reservoir formed of a dual wall to form a layer  
5 for preheating water and insulating heat, and a burner and a discharge hole at both sides of the water reservoir;
  - a cylindrical wall body having an open upper portion and installed inside the casing with a gap therefrom and to a predetermined height from a bottom of the casing, to form a combustion chamber and simultaneously a  
10 combustion gas discharge delay path;
  - a first heating portion installed in the wall body and heating the water supplied through a connection pipe connected to the outlet and preheated in the water reservoir;
  - a second heating portion interposed between the casing and the wall  
15 body and connected to an end portion of the first heating portion, to reheat the water primarily heated by the first heating portion;
  - a waste gas discharge pipe installed on and along an outer wall of the casing to a predetermined length from the discharge hole; and
  - a steam discharge pipe extending a predetermined length from an  
20 end portion of the second heating portion and penetrating the discharge hole of the casing and the waste gas discharge pipe to an outside thereof.
2. The steam generator of claim 1, further comprising an auxiliary tank which is provided on the steam discharge pipe to temporarily  
25 store steam and discharge the stored steam when a steam injection pressure decreases so as to maintain a constant steam injection pressure.
3. The steam generator of claim 1, wherein the wall body is arranged in the casing to be overlapped and the combustion gas discharge  
30 path is formed to be multi-stepped and curved zigzag so that discharge of combustion gas is delayed.

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Fig 1

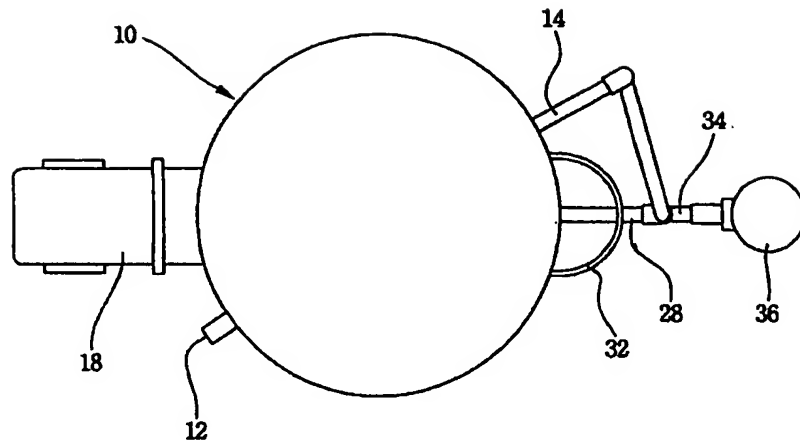
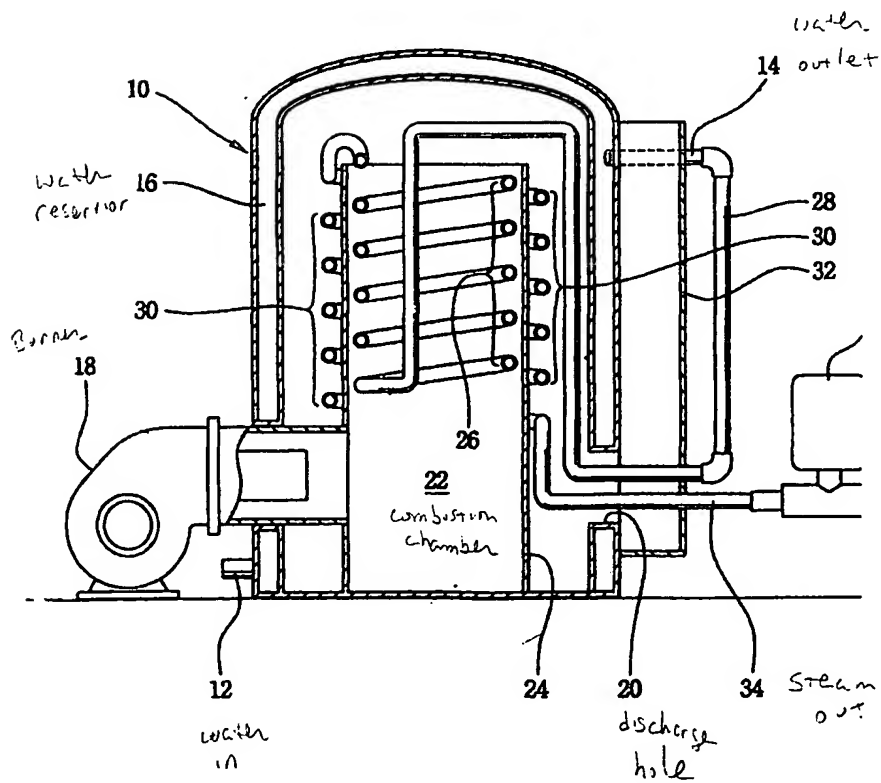


Fig 2



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/KR2004/000433

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC7 B60S 3/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC7 B60S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR IPC as above

JP IPC as above (Utility models)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

New Patents And Utility Models Serch System (KIPONET)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 20-0272697 Y1 (PARK Y. D.) 18 Apr. 2002 Figs. 1-4; Claims	1 - 3
A	KR 2000-0063638 A (UJIN CO.) 6 Nov. 2000 Figs. 1-9; Claims	1 - 3
A	US 4,532,983 A (Haden Schweitzer Corporation) 6 Aug. 1985 See the entire document	1 - 3
A	US 4,671,856 A (Superstill Tecnology, INC.) 9 Jun. 1987 See the entire document	1 - 3
A	US4,589,893 A (Stein Industrie) 20 May 1986 See the entire document	1 - 3

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

17 JUNE 2004 (17.06.2004)

Date of mailing of the international search report

17 JUNE 2004 (17.06.2004)

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Authorized officer

JEONG, Il Young

Telephone No. 82-42-481-5418



## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2004/000433

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